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STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

LEE, SIU M

ART UNIT	PAPER NUMBER
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2611

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/791,527	SAEY, DIMITRI	
	Examiner	Art Unit	
	SIU M. LEE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7-11, 14-16, 19-23, 26 and 27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-11, 14-16, 19-23, 26 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 7-11, 14, 20-23, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. (Peeters) (US 2001/0012783 A1) in view of Klinski (US 2002/0039398 A1).

(1) Regarding claim 1:

Peeters et al. discloses a modem comprising:

a carriergroup transmitting means (BiGi_Tx of Rx modem in figure 1) configured to be coupled to a transmission channel (Line (twisted pair) in figure 1);

a carriergroup receiving means (DMOD of Rx modem in figure 1) configured to be coupled to the transmission channel (Line (twisted pair) in figure 1) for receiving parameters relating to a plurality of carriers in the transmission channel;

a carriergrouping means (CHANNEL and BiGi_PROD of Rx modem in figure 1), configured to be coupled to the carriergroup transmitting means and to the carriergroup receiving means, for determining at least one carriergroup parameter (constellation information message that contains the bit loading information and the gain information, paragraph 0019, lines 13-16) and at least one dynamically variable size carrier group for

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the plurality of carriers in the transmission channel based on the parameters received by the carriergroup receiving means (channel analyzing circuitry CHANNEL receives a predetermined sequence from the Tx modem and measures the signal to noise ratio for each carrier, paragraph 0019, lines 4-7) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the

constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that the grouping of the carriers and transmitting parameters to other modems are performed dynamically and the size of each carrier subset will vary depending on the signal to noise ratio of each carrier);

wherein the carriergroup transmitting means transmits at least one message to the transmission channel comprising the at least one carrier group parameter and the at least one carrier group (the constellation information message is transmitted over the phone line LINE from the constellation information transmitter BiGi_Tx to the constellation information receiver BiGi_RX, paragraph 0019, lines 17-20) .

Peeters fails to disclose a tone decoder configured to be coupled to the transmission channel and wherein the at least one carriergroup parameter is used to set up the tone decoder.

However, Klinski discloses a tone decoder (decoding block 19 in figure 1) configured to be coupled to the transmission channel (decoding block 19 is coupled to the transmission channel 2 as shown in figure 1) and wherein the tone decoder is being setup by the bit allocation information (downstream decoder 19 decodes the received data as a function of the bit allocation information, paragraph 0039, lines 20-22).

It is desirable to have a tone decoder configured to be coupled to the transmission channel and wherein the at least one carriergroup parameter (the at least one carriergroup parameters provide a bit allocation information to be used by tone decoder) is used to set up the tone decoder because the decoder can correctly decode the received data according to the number of bits in each carrier. Therefore, it would

have been obvious to one of ordinary skill in the art at the time of invention to combine the decoder of Klinski in the system of Peeters to optimize the capacitor of the tones.

(2) Regarding claim 8:

Peeters et al. discloses a method for grouping a plurality of carriers in a DMT communication system, the method comprising the steps of:

determining at least one dynamically variable sized carrier group for the plurality of carriers (after channel analysis, the carriers are grouped in subset of carriers, paragraph 0021, lines 3-6) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into

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difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be performed according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From these two paragraphs (paragraph 0021 and 0023), it is inherent that the grouping of the carriers and transmitting parameters to other modems are performed dynamically and the size of each carrier subset will vary depending on the signal to noise ratio of each carrier);

determining at least one carrier group parameter for the at least one carrier group (the constitution of the subsets of carriers is determined); and

sending at least one message comprising the at least one carrier group parameter (the subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be reported via message, paragraph 0021, lines 7-10).

Peeters fails to disclose using the at least one carrier group parameter to set up a tone decoder.

However, Klinski discloses a method wherein the tone decoder is being setup by the bit allocation information (downstream decoder 19 decodes the received data as a function of the bit allocation information, paragraph 0039, lines 20-22).

It is desirable to have a tone decoder configured to be coupled to the transmission channel and wherein the at least one carrier group parameter (the at least one carrier group parameters provide a bit allocation information to be used by tone

decoder) is used to set up the tone decoder because the decoder can correctly decode the received data according to the number of bits in each carrier. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the decoder of Klinski in the system of Peeters to optimize the capacitor of the tones.

(3) Regarding claim 20:

Peeters et al. discloses a modem for grouping a plurality of carriers in a DMT communication system coupled to a far-end modem via a transmission channel (figure 1, the Rx modem and the Tx modem), the modem comprising:

carrier grouping means (channel analyzing circuitry (CHANNEL) in the Rx modem in figure 1, paragraph 0019, lines 5) for determining multiple dynamically variable sized carrier groups for the plurality of carriers and for determining at least one carrier group parameter for each of the multiple carrier groups (after channel analysis (measuring of the signal-to-noise ratio of each carrier), the carriers are grouped in subsets of carriers where the same amount of bits will be allocated, paragraph 0021, lines 3-5) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel

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characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that the grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier); and

carriergroup transmitting means (BiGi Tx of Rx modem in figure 1) for transmitting messages (constellation information) comprising the at least one carriergroup parameter to the far-end modem (Tx modem in figure 1) via the transmission channel (line in figure 1), to enable the far-end modem to send and receive messages using the multiple carrier groups (the bit loading and the gain information contain in the constellation information is being used in the Tx and Rx modem for transmission, paragraph 0008).

Peeters fails to disclose a tone decoder coupled to the transmission channel wherein the at least one carriergroup parameter is used to set up the tone decoder.

However, Klinski discloses a tone decoder (decoding block 19 in figure 1) configured to be coupled to the transmission channel (decoding block 19 is coupled to the transmission channel 2 as shown in figure 1) and wherein the tone decoder is being setup by the bit allocation information (downstream decoder 19 decoders the received data as a function of the bit allocation information, paragraph 0039, lines 20-22).

It is desirable to have a tone decoder configured to be coupled to the transmission channel and wherein the at least one carriergroup parameter (the at least one carriergroup parameters provide a bit allocation information to be used by tone decoder) is used to set up the tone decoder because the decoder can correctly decode the received data according to the number of bits in each carrier. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the decoder of Klinski in the system of Peeters to improve the efficiency of the system.

(4) Regarding claims 2, 9, and 21:

Peeters and Klinski discloses all the subject matter except explicitly disclose wherein the at least one carriergroup parameter transmitted by the carriergroup transmitting means is a carriergroup SNR parameter for the plurality of carriergroup.

However, Peeters et al. discloses wherein the at least one carriergroup parameter transmitted by the carriergroup transmitting means is a bit loading number for the carriergroup for the plurality of carriergroup (paragraph 0020, lines 3-8).

It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the bit loading for a carrier is proportional to the signal-to-noise ratio; with a high SNR, the carrier can transmit more bits; therefore the bit loading information for a carriergroup is another form of representation of the signal-to noise ratio. In the instant application, the far end modem receives the transmitted SNR parameter and uses the SNR for determining the bit loading information for the carrier group. Peeters et al. discloses that the near end modem used the measured SNR to determine the bit loading information and then transmitted the bit loading information to the far end modem. Therefore, it would have been an obvious design choice to one of ordinary skill in the art.

(5) Regarding claim 3, 10, 22:

Peeters further discloses that a bit number at which the carrier with the lowest index in the subset should be transmitted (paragraph 0020, lines 6-7) (the examiner interprets that the lowest index in the subset means the carrier with the lowest bit loading number, it means the carrier with the lowest signal-to-noise ratio, which is the worst case SNR).

(6) Regarding claim 4 and 23:

Peeters discloses wherein the carriergroup parameter is a carriergroup bitloading parameter (the set of parameter values for a carrier subset may consist of a bit number, carrier belonging to the same subset will be modulated with an equal amount of bits, paragraph 0008).

(7) Regarding claim 11:

Peeters et al. discloses wherein the step of determining a carriergroup parameter for the carriergroup comprises determining at least one carriergroup bitloading for the at least one carriergroup (the constellation information message that indicates bit and gain assignment to the upstream carriers is thus also kept short, paragraph 0022, lines 4-6).

(8) Regarding claims 7, 14, and 26:

Klinski further discloses means for using at least one message to the transmission channel comprising the at least one carriergroup parameter and the at least one carrier group to set up a tone encoder in a far-end modem coupled to the transmission channel (the coder 11 in figure 2 code the transmitted data as a function of a bit allocation table 15, paragraph 0037, lines 3-4, the transmission-end and receiver-end bit allocation table 9 and 15 are also adapted and matched via a separate return channel in the multicarrier system, paragraph 0039, lines 25-28).

It is desirable to have means for using at least one message to the transmission channel comprising the at least one carriergroup parameter and the at least one carrier group to set up a tone encoder in a far-end modem coupled to the transmission channel because the carriergroup information provide a optimum bit loading information for each tone for transmission. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the encoder of Klinski in the system of Peeters to improve the integrity and efficiency of the system.

3. Claims 15, 16, 19, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. (Peeters) (US 2001/0012783 A1) in view of Kwon et al. (Kwon) (US 2004/0081191 A1).

(1) Regarding claim 15:

Peeters et al. discloses a method for grouping a plurality of carriers in a DMT communication system, the DMT communication system comprising a near end (Rx modem in figure 1) and a far end modem (Tx modem in figure 1), the method comprising the steps of:

determining at least one dynamically variable sized carriergroup from the plurality of carriers (the 4096 carriers are grouped in a 8 group subsets each consisting of 512 carriers) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for

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each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that the grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier);

determining a carriergroup signal-to-noise ratio for the at least one carriergroup (the channel analyzing circuitry CHANNEL upon transmission of a predetermined sequence measures the signal-to-noise ratio (SNR) for each carrier f_0 to f_{4095} , paragraph 0019, lines 4-13);

determining a carriergroup bitloading and a carriergroup gain for the at least one carriergroup based on the carriergroup signal-to-noise ratio (this signal-to-noise ratio values are used by the constellation information producer to determine for each carrier subset the number of bits that can be modulated on each carrier of this subset and the gain where each carrier of this subset should be transmitted with (paragraph 0019, lines 8-13); and

using the carriergroup bitloading and the carriergroup gain for the at least one carriergroup for transmitting messages from the near end modem to the far end modem (the set of parameter values for a carrier subset may consist of a bit number and a gain value, as a result carriers belonging to the same subset will be modulated with an equal amount of bits and will be transmitted with the same gain, paragraph 0008).

Peeters fails to disclose using the carriergroup bitloading and the carriergroup gain for the at least one carriergroup for setting up a tone decoder in the near end modem.

However, Kwon et al. a QAM decoder 118 in figure 3 that uses the bit loading information and decode the received data (paragraph 0040, lines 4-6) and wherein the bit loading information contains bit and gain information (paragraph 0014, lines 8-11) (since each of the transmitter and receiver in figure 3 is part of the modem (transceiver) therefore, each of them can be a near end modem).

It is desirable to use the carriergroup bitloading and the carriergroup gain for the at least one carriergroup for setting up a tone decoder in the near end modem because it can fully utilize the capacity of the channel for transmission. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the decoder of Kwon in the method of Peeters to improve the efficiency of the method.

(2) Regarding claim 16:

Peeters further discloses that a bit number at which the carrier with the lowest index in the subset should be transmitted (paragraph 0020, lines 6-7) (the examiner interprets that the lowest index in the subset means the carrier with the lowest bit loading

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number, it is means the carrier with the lowest signal-to-noises ratio, which is the worst case SNR).

(3) Regarding claim 19:

Peeters et al. discloses a method wherein the communication system is VDSL system (paragraph 0019, lines 1-2).

(4) Regarding claim 27:

Kwon discloses wherein the carriergroup bitloading and the carriergroup gain for the at least one carrier group is used to set up a tone encoder in a far end modem (the QAM encoder 100 modulates input bits according to a QAM modulation method and performs an M-ary mapping of the modulated bits according to bit loading information, paragraph 0038, lines 1-4; and the bit load information includes bit and gain information, paragraph 0014, lines 8-11).

It is desirable for the carriergroup bitloading and the carriergroup gain for the at least one carrier group is used to set up a tone encoder in a far end modem because the bitloading and gain information enable transmission with high reliability and optimize the capacity of the tones. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the decoder of Kwon in the method of Peeters to improve the efficiency of the method.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Grube et al. (US 5,539,777) discloses a method and apparatus

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for a DMT receiver having a data de-formatter coupled directly to a constellation decoder. Sadri et al. (US 2005/0032514 A1) discloses an apparatus and associated methods to perform intelligent transmit power control with subcarrier puncturing. Mattsev et al. (US 7,286,609 B2) discloses an adaptive multicarrier wireless communication system, apparatus and associated methods. Peeters (US 7,269,209 B2) disclose discrete multitone transmission and reception. Kao et al. (US 6,295,515 B1) discloses dual mode bit and gain loading circuit and process. Wu et al. (US 6,134,273) discloses bit loading and rate adaptation on DMT DSL data transmission. Osaksson et al. (US 6,366,554 B1) discloses a multi-carrier transmission system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Siu M Lee/
Examiner, Art Unit 2611
3/25/2008

/CHIEH M FAN/
Supervisory Patent Examiner, Art Unit 2611